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09/929,488	08/15/2001	Kimikazu Matsumoto	250901/00	1362

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EXAMINER

RUDE, TIMOTHY L

ART UNIT	PAPER NUMBER
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2871

DATE MAILED: 08/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/929,488

Applicant(s)

MATSUMOTO, KIMIKAZU

Examiner

Timothy L Rude

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-- **Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --**
Period of Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 June 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 18-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claims

1. Claims 1, 2, and 3 are amended, and the rejection of claim 3 under 35 U.S.C. 112, second paragraph, is withdrawn. Claims 10-20 are added.

Claim Objections

2. Claim 10 is objected to because of the following informalities: Recitations "a first end of said liquid crystal" and "a first angle relative to a reference point" are unclear. The claimed device comprises a liquid crystal layer comprising molecular alignments wherein an edge of liquid crystal molecules (as opposed to an end) are aligned substantially parallel with the substrate, and an angle is defined with respect to a line (as opposed to a point). Appropriate corrections are required.

Election/Restrictions

3. Newly submitted claims 18-20 directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 18-20, drawn to a method of producing a liquid crystal display (LCD) device, classified in class 349, subclass 187.
- II. Claims 1-17, drawn to a LCD device, classified in class 349, subclass 141.

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The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made by a process whereby the wiring of the common electrode and the pixel electrode is accomplished in the same step as patterning the common wiring and source/drain wiring, rather than subsequent to forming the electrodes. Also, the aligning treatments may be performed in reverse order or simultaneously.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 18-20 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-7 and 10-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baur et al (Baur) USPAT 5,576,867.

As to claims 1, 2, 10-12, and 14, Baur discloses in Figures 1-8 a number of embodiments of an active matrix type liquid crystal display device, comprising: a thin film transistor (TFT) substrate (col. 5, lines 56-59) having a common wiring and a source/drain wiring formed on a first substrate, said first substrate being provided with an insulating film, 8, Figure 1, covering said common wiring and said source/drain wiring, said insulating film being coated with a first alignment layer, 5, Figure 1; an opposite substrate opposing to said TFT substrate having a second alignment layer, 6, Figure 1, formed on a second substrate; a liquid crystal held between said first alignment layer and said second alignment layer; and a stripe or line-type electrode, 9, Figure 1 (Applicant's common electrode), and a stripe or line-type electrode, 10, Figure 1 (Applicant's pixel electrode) wired in parallel with each other being formed as parts of said common wiring and said source/drain wiring, respectively.

Baur does not explicitly disclose 0.5 to 4.0 degrees.

Baur teaches that an angle made between a direction in which said first alignment layer is subjected to an aligning treatment and a direction in which said second alignment layer is subjected to an aligning treatment is set to a value of β (col. 8, lines 60-65, and col. 13, lines 39-44) is within 15 degree of 0° (overlaps Applicant's 0.5 to 4.0 degrees and 1.5 to 2.0 degrees) to produce a display with low dependence of image contrast on viewing angle (Abstract). Therefore, optimization of the results effective variable β to comprise Applicant's ranges of 0.5 to 4.0 degrees and 1.5 to 2.0 degrees would have been obvious to those having ordinary skill in the art of liquid crystals.

Baur is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to comprise an angle made between a direction in which said first alignment layer is subjected to aligning treatment and a direction in which said second alignment layer is subjected to aligning treatment is set to a value of 0.5 to 4.0 degrees or 1.5 to 2.0 degrees to produce a display with low dependence of image contrast on viewing angle.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Baur with an angle made between a direction in which said first alignment layer is subjected to aligning treatment and a direction in which said second alignment layer is subjected to aligning treatment is set to a value of 0.5 to 4.0 degrees or 1.5 to 2.0 degrees to produce a display with low dependence of image contrast on viewing angle.

Please note that the newly added limitations “in order to decrease a maximum voltage between the pixel electrode and the common electrode, and to increase a response of switching said liquid crystal while a high contrast ratio is sustained” is a motivation that would be met since the structure of Baur meets the claimed structural limitations of the device claims, per Applicant’s enabling disclosure.

As to claims 3, 4, and 13, Baur teaches an embodiment wherein said direction in which said first alignment layer is subjected to said aligning treatment has an angle of $\beta_0 - \beta$ (col. 8, line 60 through col. 9, line 17) where β_0 is $>0^\circ$ and $<20^\circ$ and β is $0^\circ \pm 15^\circ$ which yields a maximum range of 5 to 35 degrees (overlaps Applicant’s 5 to 45 degrees) (col. 10, Table 2, line D2) with respect to a parallel direction in which said common electrode and said pixel electrode are wired in parallel with each other, wherein an angle made between a direction in which said second alignment layer is subjected to aligning treatment and a direction in which said common electrode and said pixel electrode are wired in parallel with each other is larger than an angle made between said direction in which said first alignment layer is subjected to aligning treatment and a direction in which said common electrode and said pixel electrode are wired in parallel with each other due to twist angle β being $0^\circ \pm 15^\circ$.

As to claim 5, Baur discloses a display wherein said TFT substrate and said opposite substrate having said liquid crystal therebetween include a first substrate side polarizer and a second substrate side polarizer on opposite sides opposing to inner

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sides of said TFT substrate and said opposite substrate facing said liquid crystal, respectively, and in said first substrate side polarizer and said second substrate side polarizer, the absorption axis and transmission axis are mutually orthogonal and ψ is 0° or 90° (col. 9, lines 25-35, and col. 10, Table 2, line D2) (Applicant's any one of the absorption axis and the transmission axis of said first substrate side polarizer agrees with said direction in which said first alignment layer is subjected to aligning treatment).

As to claim 6, Baur discloses a display wherein a distance between surfaces of said first alignment layer and said second alignment layer opposing to each other is set to a value of $1.0\text{ }\mu\text{m}$ to $10.0\text{ }\mu\text{m}$ (col. 11, lines 44-50) (overlaps Applicant's $1.0\text{ }\mu\text{m}$ to $6.0\text{ }\mu\text{m}$). Therefore, optimization of the results effective variable to comprise Applicant's range would have been obvious to those having ordinary skill in the art of liquid crystals.

As to claim 7, Baur discloses a display wherein a distance between said common electrode and said pixel electrode wired in parallel with each other is set to a value of $2\text{ }\mu\text{m}$ to $50\text{ }\mu\text{m}$ (col. 11, lines 47-51) (overlaps Applicant's $2\text{ }\mu\text{m}$ to $15\text{ }\mu\text{m}$).

Therefore, optimization of the results effective variable to comprise Applicant's range would have been obvious to those having ordinary skill in the art of liquid crystals.

As to claims 15-17, Baur discloses a display wherein normally black and normally white mode may be established with proper twist and/or polarizer and analyzer angles

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(col. 5, lines 16-27 and col. 25, lines 50-56). Also, since the contrast ratio is not infinite, some light transmittance must occur in the black display state.

5. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baur in view of Applicant's admitted prior art (APA).

As to claims 8 and 9, Baur does not explicitly disclose a display wherein a gate wiring of a thin film transistor is formed on said first substrate simultaneously with said common wiring and wherein an island disposed above said common wiring and made of a semiconductor film is formed in said insulating film, and said island constitutes an active region of a thin film transistor. However, these are merely common knowledge means of comprising a satisfactory TFT display configuration.

Applicant's admitted prior art (APA) discloses these claimed features in Applicant's Figures 1A and 1B to comprise a satisfactory TFT display configuration.

FIG. 1A(PRIOR ART)

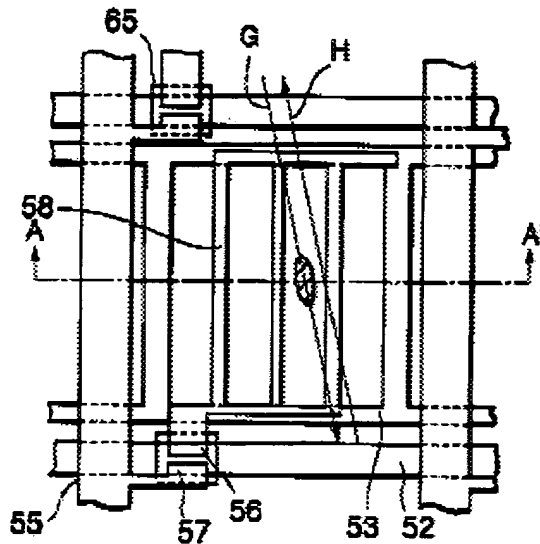
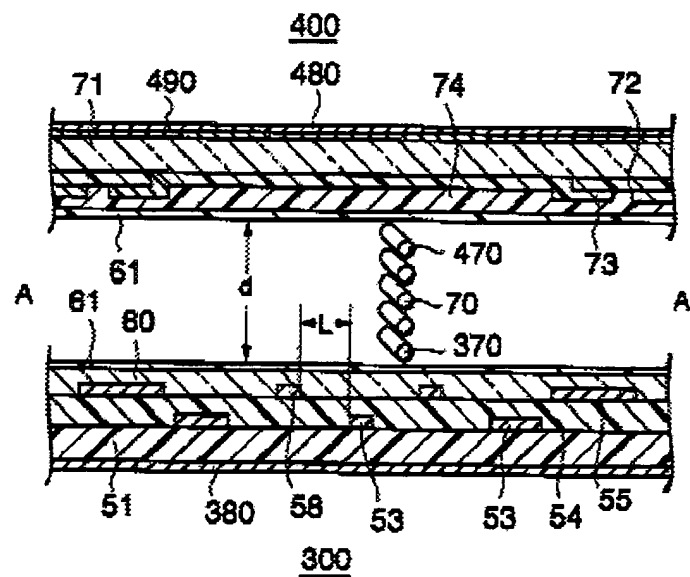


FIG. 1B



APA is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add a display wherein a gate wiring of a thin film transistor is formed on said first substrate simultaneously with said common wiring and wherein an island disposed above said common wiring and made of a semiconductor

film is formed in said insulating film, and said island constitutes an active region of a thin film transistor to comprise a satisfactory TFT display configuration.

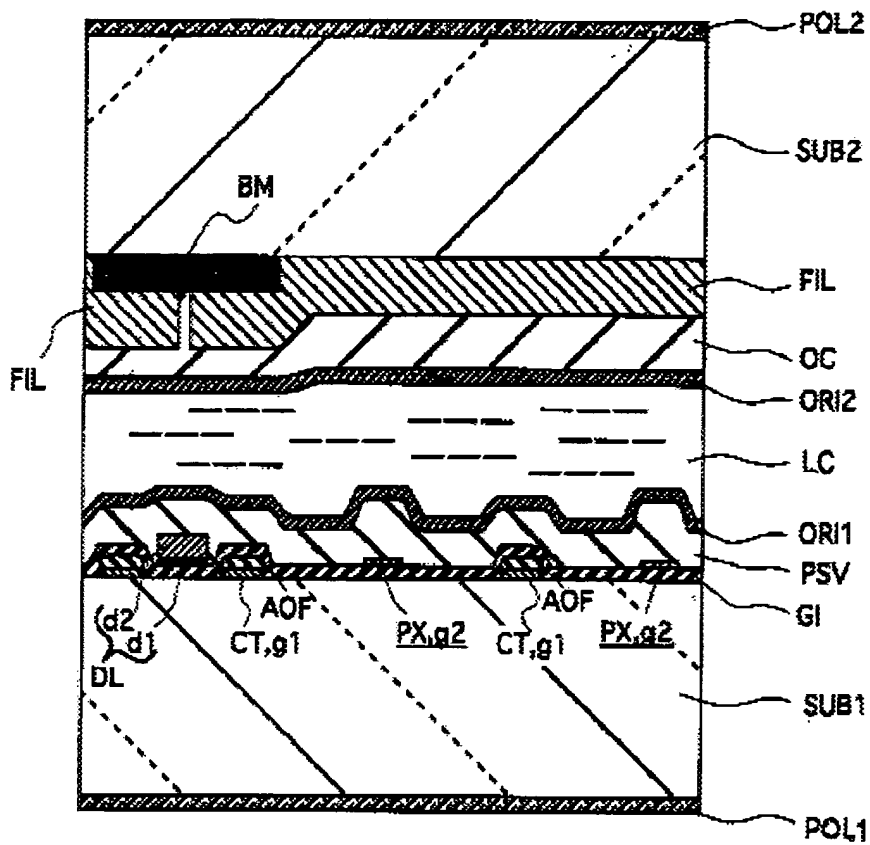
Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Baur with a display wherein a gate wiring of a thin film transistor is formed on said first substrate simultaneously with said common wiring and wherein an island disposed above said common wiring and made of a semiconductor film is formed in said insulating film, and said island constitutes an active region of a thin film transistor of APA to comprise a satisfactory TFT display configuration.

6. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baur in view of Ohta et al (Ohta) USPAT 6,532,053 B2. (Note: APA typo deleted)

As to claims 8 and 9, Baur does not explicitly disclose a display wherein a gate wiring of a thin film transistor is formed on said first substrate simultaneously with said common wiring and wherein an island disposed above said common wiring and made of a semiconductor film is formed in said insulating film, and said island constitutes an active region of a thin film transistor. However, these are merely common knowledge means of comprising a satisfactory TFT display configuration.

Ohta discloses these claimed features in Figures 2 and 3 to comprise a satisfactory TFT display configuration with *inter alia* wide viewing angle (Abstract).

FIG. 2



A cross-sectional view of a TFT-LED device. The structure is built on a substrate labeled SUB1. A layer labeled GT,g1 is formed on the substrate. Above this, a layer labeled PX,g2 is formed. A central region is labeled AOF. On top of the AOF, there is a central rectangular region labeled d0, flanked by two trapezoidal regions labeled d1 and d2. The entire structure is covered by a layer labeled TFT. The top surface of the TFT layer is labeled AS. The side walls of the TFT layer are labeled SD1 and SD2.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Baur with a display wherein a gate wiring of a thin film transistor is formed on said first substrate simultaneously with said common wiring and wherein an island disposed above said common wiring and made of a semiconductor film is formed in said insulating film, and

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said island constitutes an active region of a thin film transistor of Ohta to comprise a satisfactory TFT display configuration with wide viewing angle.

Response to Arguments

7. Applicant's arguments filed on 16 June 2003 have been fully considered but they are not persuasive.

Applicant's ONLY arguments are as follows:

- (1) In Baur, the twist is an all or nothing twist.
- (2) Baur does not disclose a structure as claimed to decrease a maximum voltage between the pixel electrode and the common electrode, and to increase a response of switching said liquid crystal while a high contrast ratio is sustained.
- (3) The references are much different from the present invention.

Examiner's responses to Applicant's ONLY arguments are as follows:

- (1) It is respectfully pointed out that Baur teaches continuous adjustment of the liquid crystal layer for varying light transmission in the range between essentially maximum and minimum, as opposed to "all or nothing", per rejections above.
- (2) It is respectfully pointed out that Applicant's motivation limitations of "in order to decrease a maximum voltage between the pixel electrode and the common electrode, and to increase a response of switching said liquid crystal while a high contrast ratio is sustained" would be met since the structure of Baur meets the claimed

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structural limitations of the device claims, per Applicant's enabling disclosure. Also, although Baur is not required to have the same motivation, please note that Baur discloses his motivation is to produce a display with low dependence of image contrast on viewing angle (Abstract).

(3) It is respectfully pointed out that the structure of the device claims, as broadly written, are met by the disclosure and teachings of the prior art, per rejections above.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy L Rude whose telephone number is (703) 305-0418. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H Kim can be reached on (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4900.

Timothy L Rude
Examiner
Art Unit 2871

TLR
August 4, 2003



TOANTON
PRIMARY EXAMINER